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EXAMINER
SHAH, PARAS D

ART UNIT	PAPER NUMBER
2626	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

	Application No.	Applicant(s)
Office Action Summary	10/019,883	YUAN ET AL.
	Examiner	Art Unit	
	PARAS SHAH	2626	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS,
WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed
  after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any
  earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>01/05/2009</u>.

2a)☒ This action is **FINAL**.   2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is
closed in accordance with the practice under _Ex parte Quayle_, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>1-15</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) <u>1-15</u> is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All   b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage
application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1)☒ Notice of References Cited (PTO-892)

2)☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3)☐ Information Disclosure Statement(s) (PTO/SB/08)
    Paper No(s)/Mail Date _____.

4)☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____.

5)☐ Notice of Informal Patent Application

6)☐ Other: _____.

DETAILED ACTION

1.   This communication is in response to the Arguments and Amendments filed on

01/05/2009. Claims 1-15 remain pending and have been examined. The Applicants'

amendment and remarks have been carefully considered, but they do not place the

claims in condition for allowance. Accordingly, this Action has been made FINAL.

2.   All previous objections and rejections directed to the Applicant's disclosure and

claims not discussed in this Office Action have been withdrawn by the Examiner.

Response to Amendment

3.   Applicants' amendments filed on 01/05/2009 have been fully considered. The

newly amended limitations in claims 1, 6, and 11 necessitate new grounds of rejection.

Specifically, the newly added limitation of "subsequent to grouping the plurality of

phoneme clusters" necessitate new grounds for rejection.

Response to Arguments

4.   Applicant's arguments in the Arguments (pages 13-17) filed on 01/05/2009 with

regard to claims 1-15, regarding the rejections under 35 USC 103, have been fully

considered but they are moot in view of new grounds for rejection

        The rejections with regards to the 35 USC 101, pertaining to claims 11-15, have

been withdrawn in view of the amendments to the claims and Specification that were

submitted. However, the arguments presented pertaining to claims 1-15 are not

persuasive. The Applicants argue that the machine-transformation text as outlined by

the Supreme Court is the proper test to apply. In view of this argument, the Applicants

argue that the received speech signal are transformed into a plurality of phoneme

clusters and thus maintain that such test is fulfilled. The Examiner respectfully disagrees

with this assertion. To begin with, the machine-transformation test applies to a process

claim, and such decision was made subsequent to the mailing of the Office Action on

09/04/2008, where the ruling was made on 10/30/2008. The machine-transformation

test is not fulfilled by the claim. The claim is not tied to specific hardware, such as a

processor and does not result in a physical transformation of one article into another

state or thing. Speech signals are not articles since they are not capable of being

reduced alone. Further, claims 6 and 11 still are pertinent to the "useful, concrete, and

tangible result" since such limitations are related to an abstract idea of grouping

phoneme clusters where such grouping cannot be realized in tangible form. Hence, the

101 rejection is maintained.

Claim Rejections - 35 USC § 101

5.   35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of
> matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the
> conditions and requirements of this title.

Claims 1-15 are directed toward non-statutory subject matter.

Claims 1-15 are directed towards a method for recognizing an input speech of a

word sequence. To be statutory, a claimed process must either: (A) result in a physical

transformation for which a practical application is either disclosed in the specification or

would have been known to a skilled artisan (B) be limited to a practical application

which produces a useful, tangible, and concrete result. See Diehr, 450 U.S. at 183-84,

209 USPQ at 6 (quoting Cochrane v. Deener, 94 U.S. 780, 787-88 ("A [statutory]

process is a mode of treatment of certain materials to produce a given result. It is an

act, or a series of acts, performed upon the subject matter to be transformed reduced to

a different state or thing.... The process requires certain things should be done with

certain substances, and in a certain order; but the tools to be used in doing this may be

of secondary consequence."). In the present, case claims 1, 6, and 11 refers to an

algorithm for receiving speech and grouping phoneme clusters, there is no output being

defined that causes there to be a tangible result and there is no physical transformation

of the input sequence of words. Rather, there appears to be an algorithm grouping

phonemes in clusters and determining whether a second cluster is needed.. Since the

presently claimed invention neither performs a transformation, nor actively produces a

useful, concrete and tangible result claims, 16, 23 ,and 24 are directed towards non-

statutory subject matter.

　　　　As such, claims 1, 6, and 11 are directed towards nom-statutory subject matter.

The dependent claims 2-5, 7-10, and 12-15 fail to overcome 35 U.S.C. 101 rejection

directed towards independent claim 1, 6, and 11.

Claim Rejections - 35 USC § 103

6.　　　　The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in
section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are

such that the subject matter as a whole would have been obvious at the time the invention was made to a
person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived
by the manner in which the invention was made.

7.   Claims 1-15 are rejected under 35 U.S.C. 103 (a) as being unpatentable over

Kao et al. (U.S. Patent: 6,317,712 B1), hereinafter referred as Kao, in view of Hwang et

al. (US 6,141,641), hereinafter referred as Hwang.

        As per claims 1 and 11, Kao teaches a speech processing method comprising:

            receiving speech signals (Kao, figure 3, subblock 11, collects speech

data);

            processing the received speech signals (Kao, figure 3, subblock 12 and

13, training of triphone models);

            to generate a plurality of phoneme clusters (Kao, figure 3, subblock 14,

clustering of triphone by decision tree);

            grouping the plurality of phoneme clusters into a first cluster node and a

second cluster node, wherein the first cluster node comprises at least one

phoneme cluster from the plurality of phoneme clusters (Kao, figure 3, subblock

14, clustering triphones; figure 4, figure of tree shown and see col. 3, lines 47-55,

clustering is done initially with all phoneme models and cluster according to a

yes/no relationship.).

            and a likelihood increase criterion (see col. 6, lines 58-64-67, where the

nodes are split based on likelihood improvement).

            Kao does not explicitly teach determining subsequent to grouping the

plurality of phoneme clusters if a phoneme cluster in the first cluster node is to be

moved into the second cluster node based on a likelihood increase of the phone

cluster of the first cluster node belonging to the second cluster node instead of belonging to the first cluster node.

However, Hwang et al. teaches determining subsequent to grouping the plurality of phoneme clusters (see col. 8, lines 20-28 and col. 9, lines 13-17, where senones (previously grouped in tree) are selected) when the at least one phoneme cluster in the first cluster node is to be moved into the second cluster node (see col. 9, lines 30, where parameters from the deep senones are merged based on a criterion) based on a likelihood increase of the phone cluster in the first cluster node belonging to the second cluster node instead of belonging to the first cluster node (see col. 9, lines 21-25, where clustering is performed if the reduction of likelihood is least).

Kao and Hwang are analogous art because they are from a similar field of endeavor in speech processing and large vocabulary speech recognition applications. Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the speech processing as taught by Kao with the determination when one cluster being moved into another cluster as taught by Hwang for the purpose of reducing resources allocated for speech recognition (see col. 9, lines 1-6) thus allowing resources to be used elsewhere.

As to claim 11, the limitations in this claim are similar in scope to claim 1 and are rejected and further Kao teaches the machine-readable medium (see col. 2, lines 20-21, CD-ROM and software).

As per claims 2 and 12, Kao, in view of Hwang, teaches the speech processing method as claimed in claim 1.

Furthermore, Hwang teaches moving the at least one phoneme cluster in the first cluster node into the second cluster node responsive to the determination subsequent to grouping the plurality of phoneme clusters (see col. 8, lines 20-28 and col. 9, lines 13-17, where senones (previously grouped in tree and see col. 9, lines 30, where parameters from the deep senones are merged based on a criterion).

As per claims 3 and 13, Kao, in view of Hwang, teaches the speech processing method as claimed in claim 2.

Furthermore, Hwang teaches moving the at least one phoneme cluster in the first cluster node into the second cluster node when the most likelihood increase is more than a threshold value (see col. 9, lines 21-25, where clustering is performed if the reduction of likelihood is least and see col. 11, lines 51, equation 12, where the reduction is greater than 0)

As per claims 4 and 14, Kao, in view of Hwang, teaches the speech processing method as claimed in claim 1.

Furthermore, Kao teaches wherein the phoneme clusters are triphone clusters based on a hidden markov model (HMM) (see col. 3, line 41; "Applicants teach to tie triphone HMMs").

As per claims 5 and 15, Kao, in view of Hwang, teaches the speech processing method as claimed in claim 1.

Furthermore, Kao teaches grouping the triphone clusters according to answers to best phonetic context based questions related to the triphone clusters (see col. 3, lines 47-60, where clustering is performed based on yes/no questions).

.

As per claim 6, Kao teaches a speech processing system comprising:

an input to receive speech signals (Kao, figure 1, subblock MIC, figure 2, subblock MIC);

a processing unit (see col. 2, lines 18-20, PC) to:

process received speech signals (Kao, figure 3, subblock 12 and 13, training of triphone models);

generate a plurality of phoneme clusters (Kao, figure 3, subblock 14, clustering of triphone by decision tree);

group the plurality of phoneme clusters into a first cluster node and a second cluster node, wherein the first cluster node comprises at least one phoneme cluster from the plurality of phoneme clusters (Kao, figure 3, subblock 14, clustering triphones; figure 4, figure of tree shown and see col. 3, lines 47-55, clustering is done initially with all phoneme models and cluster according to a yes/no relationship.);

and a likelihood increase criterion (see col. 6, lines 58-64-67, where

the nodes are split based on likelihood improvement).

Kao does not explicitly teach determining subsequent to grouping the

plurality of phoneme clusters if a phoneme cluster in the first cluster node is to be

moved into the second cluster node based on a likelihood increase of the phone

cluster of the first cluster node belonging to the second cluster node instead of

belonging to the first cluster node.

However, Hwang et al. teaches determining subsequent to grouping the

plurality of phoneme clusters (see col. 8, lines 20-28 and col. 9, lines 13-17,

where senones (previously grouped in tree) are selected) when the at least one

phoneme cluster in the first cluster node is to be moved into the second cluster

node (see col. 9, lines 30, where parameters from the deep senones are merged

based on a criterion) based on a likelihood increase of the phone cluster in the

first cluster node belonging to the second cluster node instead of belonging to the

first cluster node (see col. 9, lines 21-25, where clustering is performed if the

reduction of likelihood is least).

 Kao and Hwang are analogous art because they are from a similar field of

endeavor in speech processing and large vocabulary speech recognition

applications. Thus, it would have been obvious to one of ordinary skill in the art at

the time the invention was made to modify the speech processing as taught by

Kao with the determination when one cluster being moved into another cluster as

taught by Hwang for the purpose of reducing resources allocated for speech
recognition (see col. 9, lines 1-6) thus allowing resources to be used elsewhere.

As per claim 7, Kao, in view of Hwang, teaches the speech processing system as
claimed in claim 6.

Furthermore, Hwang teaches moving the at least one phoneme cluster in
the first cluster node into the second cluster node responsive to the
determination subsequent to grouping the plurality of phoneme clusters (see col.
8, lines 20-28 and col. 9, lines 13-17, where senones (previously grouped in tree
and see col. 9, lines 30, where parameters from the deep senones are merged
based on a criterion).

As per claim 8, Kao, in view of Hwang, teaches the speech processing system as
claimed in claim 7.

Furthermore, Hwang teaches moving the at least one phoneme cluster in
the first cluster node into the second cluster node when the most likelihood
increase is more than a threshold value (see col. 9, lines 21-25, where clustering
is performed if the reduction of likelihood is least and see col. 11, lines 51,
equation 12, where the reduction is greater than 0)

As per claim 9, Kao, in view of Hwang, teaches the speech processing system as
claimed in claim 6.

Furthermore, Kao teaches wherein the phoneme clusters are triphone
clusters based on a hidden markov model (HMM) (see col. 3, line 41; "Applicants
teach to tie triphone HMMs").

As per claim 10, Kao, in view of Hwang, teaches the speech processing system
as claimed in claim 9.

Furthermore, Kao teaches grouping the triphone clusters according to
answers to best phonetic context based questions related to the triphone clusters
(see col. 3, lines 47-60, where clustering is performed based on yes/no
questions).

Conclusion

8.   Applicant's amendment necessitated the new ground(s) of rejection presented in
this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP
§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37
CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE
MONTHS from the mailing date of this action. In the event a first reply is filed within
TWO MONTHS of the mailing date of this final action and the advisory action is not
mailed until after the end of the THREE-MONTH shortened statutory period, then the
shortened statutory period will expire on the date the advisory action is mailed, and any
extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

9.   The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Junqua (US 5,806,030) is cited to disclose clustering phone models. Komori (US 6,108,628) is cited to disclose reclustering of speaker models. Aubert (US 6,339,759) is cited to disclose acoustic model determination based on grouping. Rigazio (US 6,526,379) is cited to disclose clustering methods for speech recognition.

Chou et al. ("High Resolution Decision Tree Based Acoustic Modelling Beyond CART") Is cited to disclose decision tree clustering based on generating likelihoods using multiple Gaussian mixtures.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to PARAS SHAH whose telephone number is (571)270-1650. The examiner can normally be reached on MON.-THURS. 7:00a.m.-4:00p.m. EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Edouard can be reached on (571)272-7603. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For

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Customer Service Representative or access to the automated information system, call

800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/P. S./
Examiner, Art Unit 2626

01/23/2009

/Patrick N. Edouard/

Supervisory Patent Examiner, Art Unit 2626